UCRL-JC-125267

A HIGH RESOLUTION, SEQUENCE-READY MAP OF THE CEA/PSG GENE FAMILY REGION ON CHROMOSOME 19q13.2.

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A high-resolution, high-redundancy clonal map has been constructed for a 2.2 Mb region in 19q13.2 encompassing, and extending beyond, the entire CEA/PSG gene family region. The majority of the map consists of overlapping cosmid clones. In addition, a number of larger insert Bacterial Artificial Chromosomes (BACs) have been incorporated to span gaps in regions not covered by the chromosome 19 cosmid libraries. The region contains a total of 29 CEA family genes, organized in two clusters of 250 kb and 850 kb, separated by a region of about 700 kb containing genes unrelated to the CEA family. The proximal CEA family cluster contains 6 CEA subgroup genes: *cen*-CGM10-CGM7-CGM2-CEA-NCA-CGM1-*tel*. The distal cluster contains 23 genes belonging to the CEA, PSG, or CGM subgroups: *cen*-BGP-CGM9-CGM6-CGM8-CGM12-PSG3-PSG8-CGM13-PSG12-PSG1-PSG6-PSG7-CGM14-PSG13-CGM15-PSG2-CGM16-PSG5-PSG4-CGM17-PSG11-CGM18-CGM11-*tel.* There is complete clonal continuity across the region, except for two small gaps remaining in the region between the CEA clusters. Non-CEA genes identified in the region between CGM1 and BGP include IGA, ATP1A3, OTF2 and LIPE. In addition, seven cDNA clones have been mapped to this region. Several copies of the 19q-specific repetitive element PE670 are interspersed in the region between CGM1 and BGP, but this repetitive element is not present within either of the CEA gene family clusters. Microsatellite genetic markers mapped to the vicinity of the CEA family include D19S223, about 700 kb proximal to CGM10; D19S197/D19S198/D19S582 near CGM7; and D19S408, in the XRCC1 gene about 250 kb distal to CGM11. A highly redundant set of overlapping clones spanning the region have been analyzed by EcoRI digestion, thereby generating a map with an average resolution of less than 10 kb. This detailed map enables the selection of a minimal spanning set of clones to serve as substrates for determination of the complete DNA sequence of the CEA gene family.

Work performed under the auspices of the US Department of Energy by Lawrence Livermore National Laboratory under Contract No. W-7405-ENG-48.

Seventh International CEA/PSG Workshop, Duarte, California, September 15-17, 1996